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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,404	12/01/2003	Shuichi Suzuki	67336-015	8895
7590	09/06/2006		EXAMINER	
MCDERMOTT, WILL & EMERY 600 13th Street, N.W. Washington, DC 20005-3096			ALEJANDRO, RAYMOND	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/724,404	SUZUKI ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 01 December 2003.  
 2a) This action is FINAL.                  2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-4 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-4 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 21 April 2004 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
     Paper No(s)/Mail Date 08/11/04.

4) Interview Summary (PTO-413)  
     Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

### *Priority*

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

### *Information Disclosure Statement*

2. The information disclosure statement (IDS) submitted on 08/11/04 was considered by the examiner.

### *Drawings*

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 100 (page 9, lines 9-10 mentions reference numeral 100 in Figure 2). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

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4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 10 (page 10, lines 11-12 mentions reference numeral 10 in Figure 3). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 23, 40, 50, 60, 70, 211, 220, 222, 311, 320, 322. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required

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corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "310" has been used to designate both "the catalyst" (Page 11, line 15) and "the carbon particles" (Page 10, line 23). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Specification*

7. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

8. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," "There is disclosed", etc.

9. The disclosure is objected to because of the following informalities: the term "membrane" appears to be misspelled (see page 1, line 23; page 2, line 1; page 9, line 16; page 11, line 4). Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

12. Claim 4 recites the limitations "*a catalyst layer*" in line 3 and "*a gas diffusion layer*" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim. Claim 1, from which claim 4 depends, contains earlier recitation thereof.

13. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: claim 4, as originally presented, recites "an anode" and "a cathode" and further recites "the electrode". Thus, it is unclear whether applicant intends to recite another electrode, other than the anode or the cathode.

14. Claim 4 provides for the use of "*the electrode...is used*", but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active,

positive steps delimiting how this use is actually practiced. Claim 4 also appears to embrace two different statutory inventions as set forth under 35 USC 101.

Claim 4 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

#### ***Claim Rejections - 35 USC § 102***

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Applicant's Admission of Prior Art (heretofore 'the AAPA').

The present application is geared toward an electrode wherein the disclosed inventive concept comprises the specific arithmetic average roughness.

#### **As to claims 1 and 4:**

The AAPA discloses fuel cells including a basic unit constituted of a cell including an anode disposed opposite to a cathode via an electrolyte; and the cell being held between one pair of separators on which ribs and gas channels are formed; a fuel gas is supplied to a gas channel on an anode side; air is supplied as an oxidant to the gas channel on a cathode side, and power is

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generated. The fuel cell includes a polymer electrolyte fuel cell using a proton exchange membrane (*Applicant's specification at page 1, lines 12-26*).

The AAPA goes to disclose a conventional gas diffusion layer including a carbon paper subjected to the water-repellent treatment coated with carbon paste; and a carbon powder having a particle size of about 75  $\mu\text{m}$  or carbon powder XC-72 is used to prepare the carbon paste (*Applicant's specification at page 12, lines 9-22*). Specifically, it is disclosed that in the conventional gas diffusion layer surface, a maximum height  $R_y$  is about 60  $\mu\text{m}$ . When this is converted to the arithmetic average roughness  $R_a$  the value is 15  $\mu\text{m}$  (*Applicant's specification at page 14, lines 17-26*). Comparative Example (*equivalent of the conventional gas diffusion electrode*) shows an Arithmetic average roughness  $R_a$  of 15  $\mu\text{m}$  (See Applicant's **Table 1**).

Therefore, the AAPA anticipates the present claims.

#### ***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

19. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admission of Prior Art (heretofore 'the AAPA') in view of Tani et al 2004/0115499.

The AAPA is applied, argued and incorporated herein for the reasons expressed above. However, the AAPA does not expressly disclose the specific roughness Ra of the gas diffusion layer.

Tani et al disclose membrane electrode structures having an electrode catalyst layer and a diffusion electrode that are laminated together (ABSTRACT/P0005,0009/**FIGURES 1f, 9f and 15**). Tani et al disclose that the maximum height Rmax of surface roughness of the hydrophilic layer of the gas diffusion electrode is set to 40  $\mu\text{m}$  or lower (P0022-0024, 0096/ **TABLE 1**).

In light of these disclosures, it would have been obvious to a person possessing a level of ordinary skill in the art at the time the invention was made to make the gas diffusion layer of the AAPA by having the specific roughness Ra of the gas diffusion layer of Tani et al because Tani et al disclose that when the surface roughness Ra is less than the specified value the membrane-electrode structure has a superior power generation efficiency due to an optimized value of the ratio of the surface area to the unit area and the differential pressure between one side of the diffusion electrode and the other side thereof (Tani et al at P0096). A prima-facie case of obviousness does exist because: i) the claimed range lies inside the range disclosed by the prior art. For this reason, this prior art reference teaching a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness. *In re Geisler* 42

*USPQ2d 1362. In re Peterson 65 USPQ2d 1379. Banner 227 USPQ 773. See MPEP 2144.05*

**[R-1] Obviousness of Ranges.**

20. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admission of Prior Art (heretofore 'the AAPA') in view of the Japanese publication JP 10-289732 (herein called the JP'732).

The AAPA is applied, argued and incorporated herein for the reasons expressed above. However, the AAPA does not expressly disclose the specific carbon powder charged in a porous carbon substrate.

The JP'732 discloses a charging a carbon powder in the gas diffusion layer to establish both the gas and water diffusion properties (*See Applicant's specification at page 2, lines 18-22*).

With these teachings, it would have been obvious to a person possessing a level of ordinary skill in the art at the time the invention was made to use the specific the specific carbon powder charged in a porous carbon substrate of the JP'732 in the electrode of the AAPA as it is disclosed that such a carbon powder charged in the porous carbon substrate permits establishing both gas and water diffusion properties. Thus, gas and water diffusion properties are improved when carbon powder is charged in the carbon substrate.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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